SMART SOLUTIONS FOR SMART MINES

Smart mines produce the minerals and metals needed for our evolving economy. With highly engineered technologies and the application of artificial intelligence, Internet of Things and Big Data, the modern mine is digitally connected and operations are optimized in all aspects, including productivity, safety, accountability, environmental performance and local community support.

PRODUCTIVITY · SAFETY · ACCOUNTABILITY · ENVIRONMENT · COMMUNITY

1 ALTERNATIVE AND RENEWABLE POWER

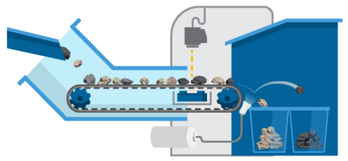
Renewable energy sources such as wind, solar and bio-energy can reduce northern, remote and isolated communities' reliance on diesel, which is expensive and generate significant GHG emissions. Small modular reactors also offer promising potential.

2 AUTOMATION

The integration of autonomous vehicles and automated technologies supports more competitive operations and enables ultra-deep and remote mines to operate more effectively and safely.

SENSOR

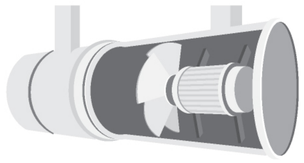
3 ORE SORTING



Ore sorting reduces the quantity of material that needs to be crushed and ground to unlock valuable minerals and metals, saving energy and resulting in less mine waste.

SENSOR

4 VENTILATION ON DEMAND



This airflow system saves energy by safely directing fresh air only when and where it is needed. This reduces ventilation costs and increases the potential for expanding a mine without the need for new infrastructure.

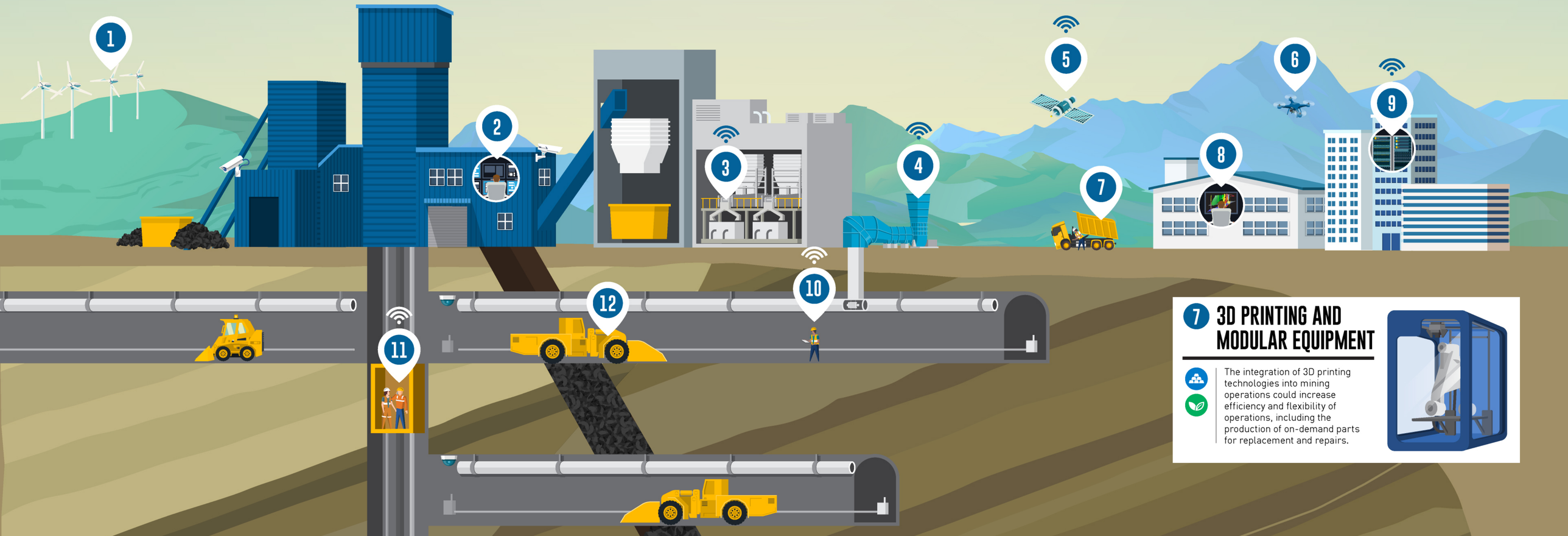
SENSOR

5 HIGH ACCURACY GPS

High accuracy GPS technology brings precision to mining. From GPS assisted precision drilling to autonomous haul trucks for worker safety, GPS enables safe and efficient operations.

6 DRONE TECHNOLOGY

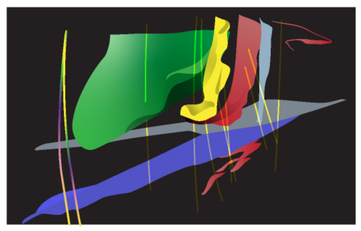
Drones provide real-time aerial footage of mining sites for maintenance, monitoring (e.g., the environment) and mapping, which improves safety, and increases efficiency and cost savings.



7 3D PRINTING AND MODULAR EQUIPMENT

The integration of 3D printing technologies into mining operations could increase efficiency and flexibility of operations, including the production of on-demand parts for replacement and repairs.

8 3D IMAGING



3D imaging of ore deposits, from their deep roots to the actual deposit, helps understand the geology of deposits for more efficient mining that reduces waste and minimizes disturbances.

SENSOR

9 DATA OPTIMIZATION & MACHINE LEARNING

Optimizing data collected from equipment and monitoring devices enables engineers to create simulations to precisely plan and schedule operations, and complete highly complex tasks.

SENSOR

10 EQUIPMENT MANAGEMENT

The shift towards smart mining includes the integration of new sensors suites to track and optimize mining operations. Digitally integrated, they capture data about all aspects of mining, and allow operators to predict and avoid failures (e.g., avoid tailing dam failure) and eliminate costly downtime.

SENSOR

11 WEARABLES ON WORKERS

Workers wearing monitoring devices will have on-demand access to critical information regarding mine operations, including equipment status reports, and air quality conditions.

12 ALTERNATIVE POWERED VEHICLES

The mine of the future will have lower carbon emissions with electrical and hydrogen powered vehicles. As an alternative to diesel power, the air quality is improved for workers operating underground.

Presented by

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